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Case Report

Diagnosis of gastric subepithelial mass as an accessory spleen using fusion of spleen SPECT and CT images

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ABSTRACT

More than 10% of the healthy population has one or more accessory spleens. An accessory spleen can be mistaken for a gastric subepithelial mass, and may not be differentiated by CT or endoscopic ultrasonography (EUS). A gastric subepithelial mass was detected on routine endoscopy in a 52-year-old man with a history of splenectomy 10 years previously for trauma. Subsequent EUS and CT located the subepithelial mass on the fourth layer of the stomach fundus. A definitive diagnosis was obtained by performing technetium-99m (^{99m}Tc-)-labeled denatured red blood cell (RBC) scintigraphy. Fusion images were obtained by combining the digital CT and SPECT images on a computer workstation. Here, we report the use of spleen SPECT and CT fusion images to diagnose a case of accessory spleen mimicking a gastric subepithelial mass, thereby avoiding the need for an invasive procedure.

Introduction

Accessory spleens are congenital or acquired foci of healthy splenic tissues that are separate from the main body of the spleen [1]. The accessory spleen represents one of the splenic variations that is relatively common, with an autopsy incidence of 10%–30% [2,3]. Typically, accessory spleen appears as a well-marginated round solitary nodule smaller than 2 cm. Contrast enhancement of the lesion similar to the spleen on CT, MRI, and US [4]. Although an accessory spleen is usually asymptomatic and incidentally discovered, it is clinically

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important in some patients. It is likely that some accessory spleens simulate tumors arising from adjacent organs such as the kidney, adrenal grand, and pancreas [2–9]. In those cases, CT, MRI, or US cannot differentiate the tissues accurately, even after contrast administration. The technetium-99m (^{99m}Tc-)-labeled denatured red blood cell (RBC) scan has been a well-recognized diagnostic method for the spleen for 30 years. This scan can also be performed with SPECT tomography, allowing evaluation of the radiotracer distribution in 3 dimensions. The SPCET/CT or SPECT and CT fusion images also provide the possibility of differential diagnosis and more precise localization of radiotracer accumulation with regard to anatomical structures [10].

Case report

A 52-year-old man presented with a gastric subepithelial mass, which had been found during routine endoscopy at another hospital. He was referred to our hospital for further management. He had a history of splenectomy 10 years earlier due to trauma. On admission, physical examination and laboratory data including peripheral blood counts and liver function tests were all unremarkable. An upper gastrointestinal endoscopy revealed a submucosal tumor approximately 2.4 cm in diameter at the gastric fundus posterior wall, consistent with a gastrointestinal stromal tumor (GIST) (Fig. 1). An EUS performed for further evaluation showed an exophytic and hypoechoic mass in the fourth layer (Fig. 2). An abdominal contrast-enhanced CT revealed a well-marginated and homogeneous enhanced ovoid mass, approximately 2.7 cm in diameter, located close to the gastric fundus (Fig. 3). The lesion was interpreted as corresponding most probably to an accessory spleen, rather than a GIST. We obtained a definitive diagnosis by performing a technetium-99m (^{99m}Tc-)-labeled denatured RBC scan. Planar scintigraphy and SPECT (Fig. 4) of the spleen were performed approximately 20 minutes after intravenous administration of 5 mCi of radiotracer. The examination used a Siemens Symbia E gamma camera. The

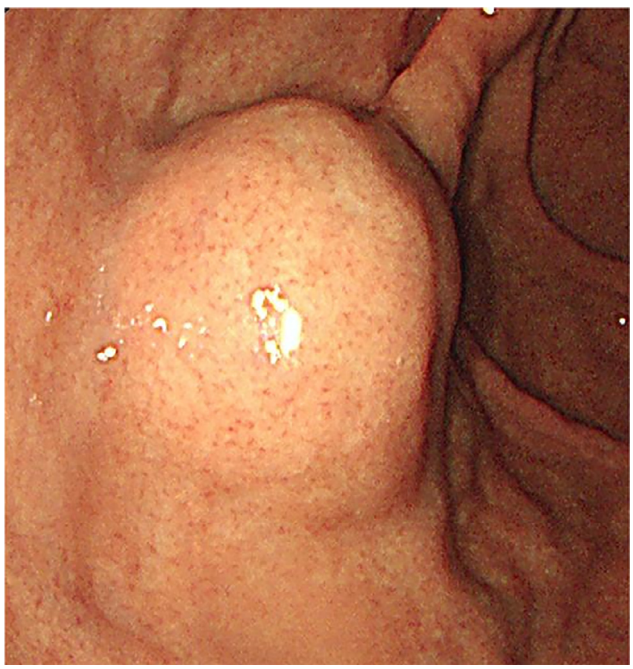

Fig. 1 – Upper gastrointestinal endoscopy revealed a subepithelial mass at the posterior wall of the gastric fundus. The mass was approximately 24 mm in diameter, hard, and had a well-demarcated margin.

Fig. 2 – Endoscopic ultrasonography showed a hypoechoic mass in the fourth layer.

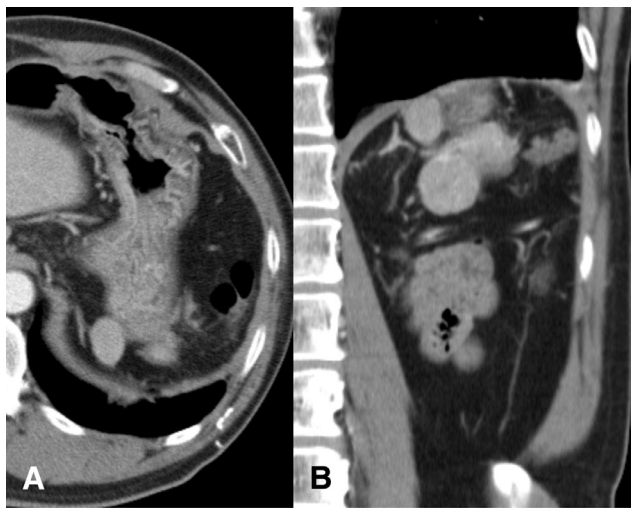

Fig. 3 – Abdominal contrast-enhanced CT axial (A) and coronal (B) images revealed a well-marginated and homogeneous enhanced ovoid mass close to the gastric fundus.

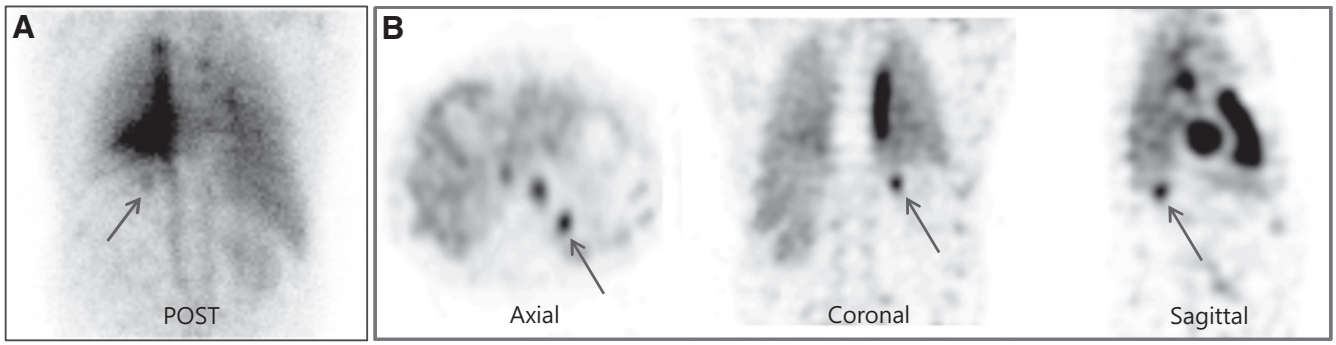

Fig. 4 – Planar (A) and SPECT (B) images of ^{99m}Tc-labeled denatured RBC spleen scintigraphy. Focal uptake is found in the left subdiaphragmatic area (arrow).

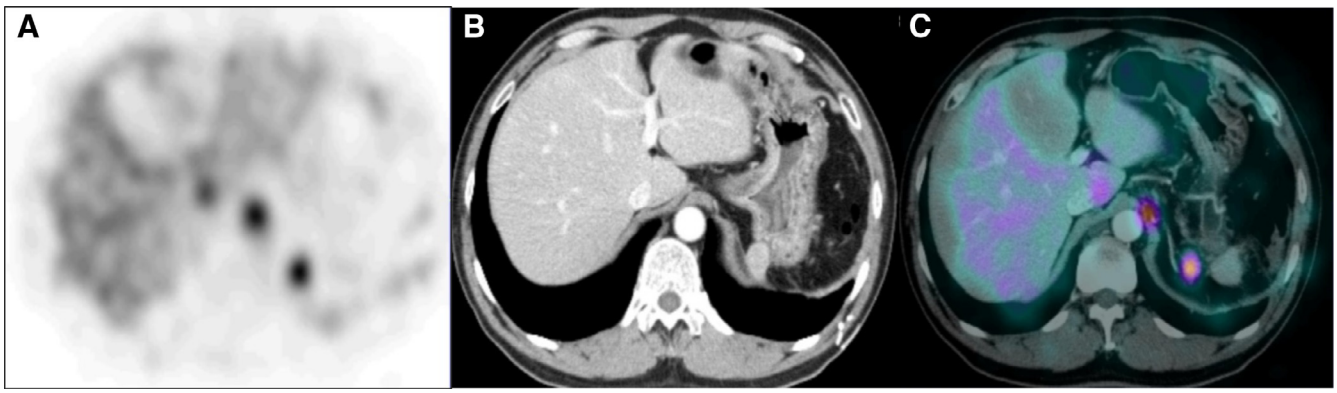

Fig. 5 – ^{99m}Tc-labeled denatured RBC spleen SPECT image (A), enhanced abdomen CT image (B) and spleen SPECT and abdomen CT fusion image (C). Focal uptake of the mass in the left subdiaphragmatic area, confirming the presence of an accessory spleen.

scan images showed focal radiotracer uptake in the left subdiaphragmatic area. SPECT and abdominal CT software fusion were performed (Fig 5). The abnormal uptake corresponded to what the clinical physician now recognized as an accessory spleen or GIST located in the gastric fundus area, confirming the presence of an accessory spleen.

The patient did not receive any further treatment and the lesion remained unchanged for more than 3 years.

Discussion

Here, we report an accessory spleen located close to the stomach fundus. This accessory spleen appeared as a GIST at endoscopy in a patient who had undergone a splenectomy 10 years earlier. Although usually asymptomatic and incidentally discovered, they are clinically important in some patients. First, an accessory spleen can have compensatory hypertrophy after splenectomy. Second, an accessory spleen may mimic lymphadenopathy and tumors in other abdominal organs, such as the pancreas, the adrenal gland, and the kidney [2–9].

CT is the imaging modality most commonly used to evaluate the abdomen. Typically, accessory spleens are well-marginated, round masses that are smaller than 2 cm and show homogeneous enhancement. Endoscopic ultrasonography is a better modality than CT for differentiating between a subepithelial mass and an extrinsic compression lesion of the stomach [11]. However, when the findings of both diagnostic methods are not consistent, pathology confirmation is required for a definite diagnosis. EUS-guided fine needle aspiration is beneficial for diagnosis of an accessory spleen that mimics a gastric subepithelial mass observed in histological examination [12]. However, EUS-guided fine needle aspiration is invasive method.

These cases of accessory spleens, ^{99m}Tc-labeled denatured RBC spleen scintigraphy provides an easy method of establishing the identity of ectopic splenic tissues [4,5]. Several studies have verified ^{99m}Tc-labeled denatured RBC spleen scintigraphy as a very sensitive and specific imaging tool for the confirmation of splenic tissue [13]. The mass in the present case, which mimicked a GIST, was readily identified by spleen scintigraphy, resulting in the definitive diagnosis of an accessory spleen.

While planar scintigraphy with Tc-99m RBC provides useful information, this 2D imaging technique is inherently lim-

ited in ability to provide functional and anatomic correlation. SPECT/CT imaging is very helpful for the anatomic localization of abnormal nuclear scintigraphy findings [10]; however, the SPECT/CT camera is expensive and is not readily available at all institutions. Fusion of SPECT and CT images using fusion software is an attractive alternative. This fusion imaging is an efficient, simple, less expensive, and more accurate method that improves the diagnostic confidence of the anatomic location with no additional radiation from CT, as in our case. The referring physicians can easily identify the lesion so they appreciate these images.

In conclusion, ^{99m}Tc-labeled denatured RBC spleen SPECT and CT fusion imaging is a useful alternative to SPECT/CT as a noninvasive diagnostic modality for the differential diagnosis of accessory spleens and gastric subepithelial masses.

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